



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

### Usage guidelines

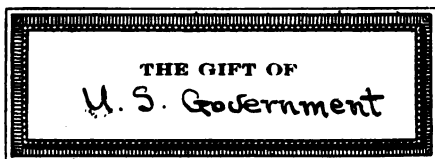
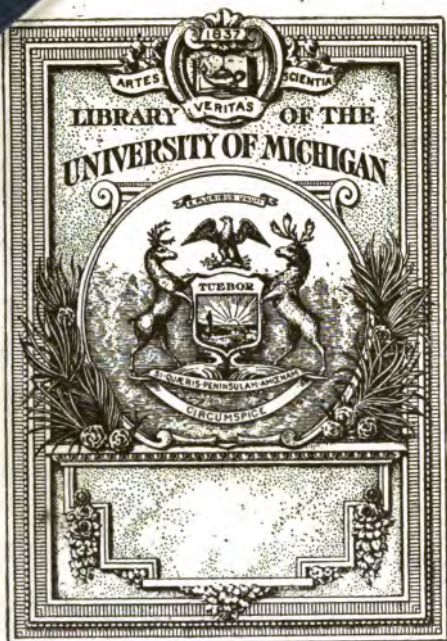
Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

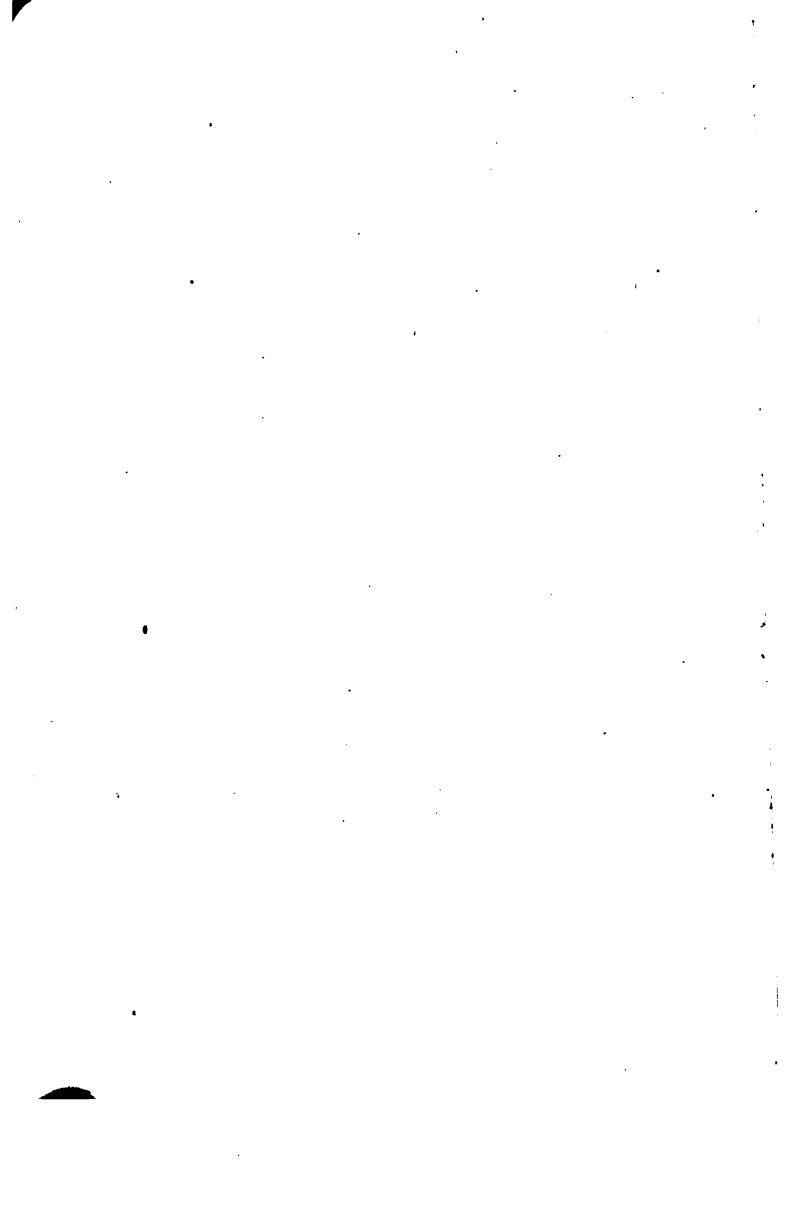
- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

### About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>



TJ  
685  
.A4  
1921



---

---

U.S. INTERSTATE COMMERCE COMMISSION  
BUREAU OF LOCOMOTIVE INSPECTION

---

INTERPRETATIONS, RULINGS, AND EX-  
PLANATIONS ON QUESTIONS RAISED

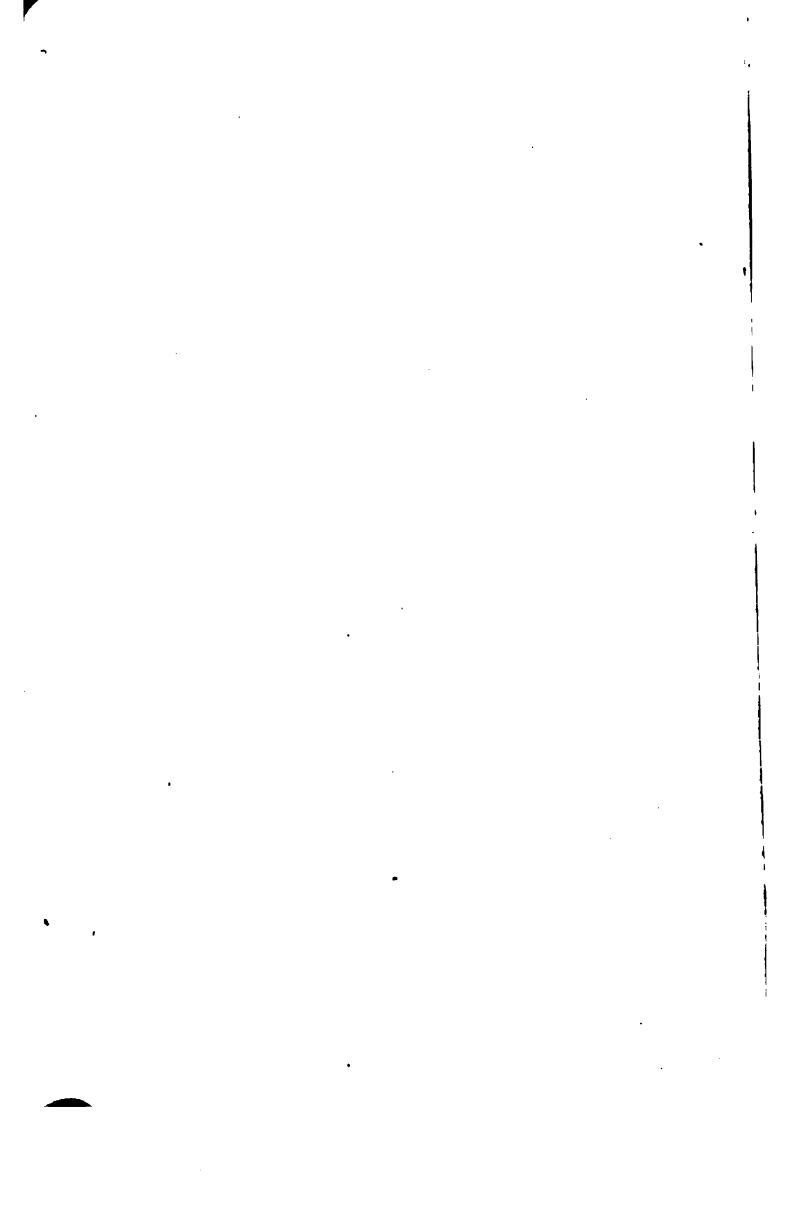
REGARDING THE

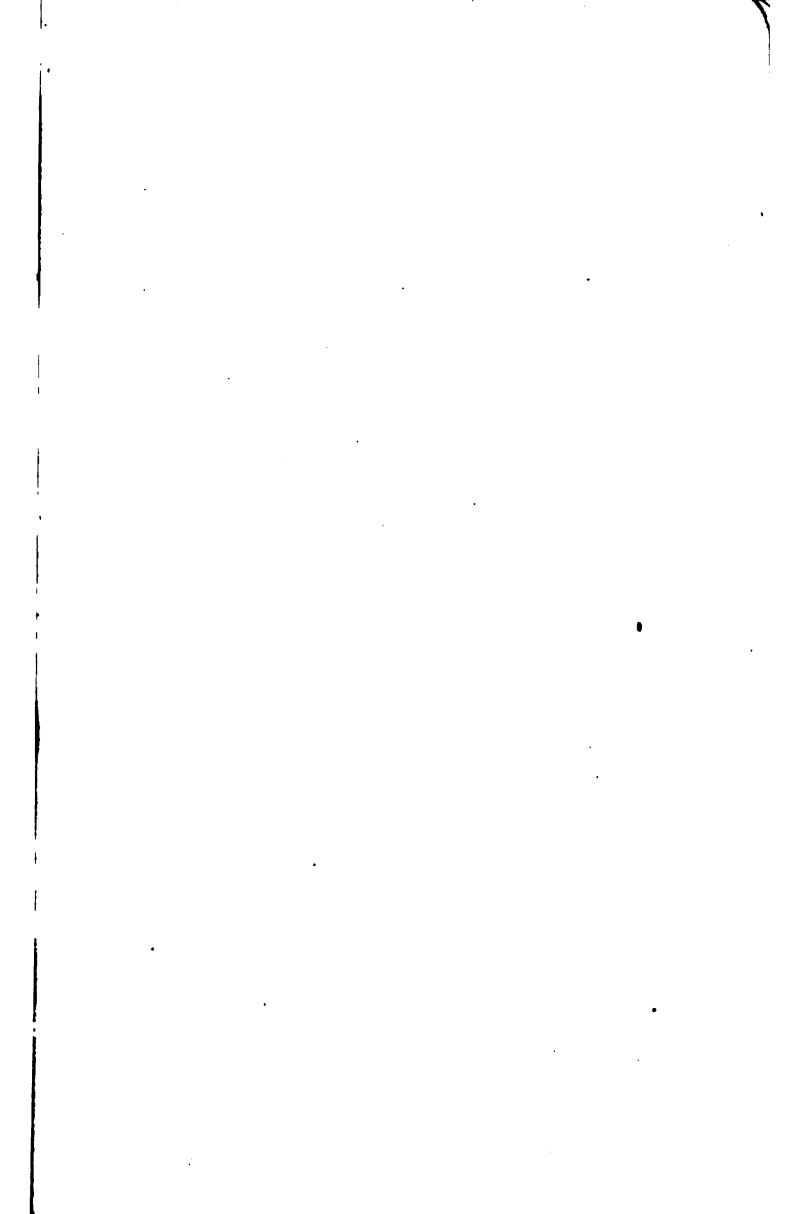


LAWS, RULES, AND INSTRUCTIONS  
FOR INSPECTION AND TESTING OF  
LOCOMOTIVES AND TENDERS AND  
THEIR APPURTENANCES

ISSUED

TO CLARIFY AND RENDER UNIFORM UNDER-  
STANDING OF THE REQUIREMENTS





(b) For locomotives stored for one or more full calendar months, removal of flues will be due after 48 calendar months' service, providing such service is performed within 5 consecutive years and the requirements of rule 10 are fully complied with.

(c) Locomotives removed from service when flues become due for removal, need not have the flues removed until just prior to being returned to service.

(d) The removal of superheater tubes every 4 years will not be required provided the tubes are in good condition and the boiler can be thoroughly cleaned and inspected without their removal.

**RULE 16. Lagging to be removed.**—(a) Locomotives in service prior to May 1, 1919, may have two years' extension of time for next removal of jacket and lagging. This extension will not apply to locomotives placed in service or having had jacket and lagging removed after May 1, 1919.

**RULE 17. Time of testing boilers.**—(a) The words "before being put into service" refer to new locomotives before entering service the first time; after that, hydrostatic test should be made every 12 months.

(b) When locomotive is taken into shop for new fire box or new flues, a hydrostatic test should be applied before the locomotive is put in service, in accordance with Rule 17, even though the hydrostatic test may not be due until some later date, and an annual locomotive inspection and repair report filed covering the locomotive.

(c) It has been agreed to accept as the date of the hydrostatic test the date on which the inspection has been completed and the locomotive is ready for service.

(d) For locomotives stored for 1 or more full calendar months, hydrostatic tests will be due after 12 calendar months' service, provided such service is performed within 24 consecutive months. Portions of calendar



months out of service will not be counted. Time out of service must be properly accounted for by out of service reports filed with the United States inspector and notations of months claimed out of service made on the back of each subsequent inspection report and cab card.

(e) A locomotive stored when hydrostatic test becomes due need not be given such test until immediately prior to its being returned to service.

(f) When the working pressure of any boiler is increased above that shown on the specification card or previous annual locomotive inspection and repair report, the boiler must be subjected to hydrostatic pressure 25 per cent above the increased pressure, and an annual locomotive inspection and repair report filed, covering the hydrostatic test, and an alteration report filed, as required by rule 54, covering the increased pressure.

**RULE 18. Removal of dome cap.**—(a) The fact that a locomotive is new does not relieve from removing dome cap and throttle standpipe in accordance with rule 18 when the hydrostatic test is applied. It will therefore be necessary to remove the dome cap and throttle standpipe in accordance with rule 18 and file report showing that the work has been done. (See Exhibit 2, item 11.)

(b) It is considered the better practice and is recommended that the dome cap be removed after hydrostatic test, in order to permit a thorough interior inspection after such test; but no instructions have been issued which conflict in any way with this rule. (See Exhibit 2, item 11.)

(c) Where the boiler is equipped with an auxiliary dome or inspection manhole, the dome cap and throttle standpipe need not be removed. Where the boiler is entered through auxiliary dome or inspection manhole, notation should be made on the margin of the report "Boiler entered through auxiliary dome."

**RULE 21. *Time of testing rigid bolts.***—(a) Stay bolts must be tested at least once each calendar month or every 30 days as nearly as operating conditions will permit on all locomotives in service. No objection, however, will be taken by the Bureau of Locomotive Inspection if the 30-day period is not exceeded by more than 5 days when conditions fully justify.

(b) The practice of making a stay-bolt inspection during the first part of one month and a second test during the latter part of the following month, allowing the period between inspections to materially exceed 30 days, is not considered a proper compliance with this rule, nor with the intent and purpose thereof.

(c) All required inspections and tests falling due at the monthly period should be made while the locomotive is out of service for monthly inspection. The date of the monthly locomotive inspection and repair report should be the date on which the work is completed and the locomotive made ready for service.

(d) If stay bolts which are behind brickwork or behind grate bearers have a telltale hole three-sixteenths inch in diameter their entire length which is kept open at all times, the removal of the brickwork or grate bearers each month for the purpose of hammer testing such bolts will not be required. This will not, however, relieve from making a thorough inspection when the brickwork is removed, nor will it relieve from removing the brickwork for an inspection whenever a United States inspector or the railroad company's inspector considers it desirable or necessary.

**RULE 23. *Method of testing flexible stay bolts with caps.***—(a) When locomotives are stored for 1 or more full calendar months, the removal of flexible stay-bolt caps for the purpose of inspection will be due after 24 calendar months' service, provided such service is performed within 3 con-

secutive years. Portions of calendar months out of service will not be counted. Time out of service must be properly accounted for by out of service reports filed with the United States inspector and notations of months claimed out of service made on the back of each subsequent inspection report and cab card.

(b) A locomotive stored when flexible stay-bolt cap removals are due need not be given such test until immediately prior to being returned to service.

(c) When locomotives are being given their annual inspection and test, flexible stay-bolt caps should be removed at the time of making this inspection, if they become due for removal before another annual inspection is due, and their removal shown on Form 3. One of the principal reasons urged for extending the time for removal of flexible stay-bolt caps from 18 months to 2 years was for the purpose of bringing the test due at every second annual inspection.

**RULE 24. Method of testing flexible stay bolts without caps.**—(a) A locomotive stored when test of flexible stay bolts without caps is due need not be given such test until immediately prior to its being returned to service.

**RULE 25. Broken stay bolts.**—(a) "Plugged" stay bolt means telltale hole has been plugged or riveted over or telltale hole missing.

(b) Telltale holes leaking, plugged, riveted over, or missing will be counted as broken stay bolts.

**RULE 26. Telltale holes.**—(a) When telltale holes one-eighth inch in diameter were drilled in stay bolts applied before July 1, 1911, they have been accepted, provided they were of proper depth and were kept open.

**RULE 27. (a)** All stay bolts behind frames and braces should be drilled when the boiler is taken from its frame, or at the first opportunity that the bolts are available for drilling.

**RULE 31. Method of testing steam gauges.**—(a) At points where monthly or annual inspections and tests are required to be made a dead-weight tester should be supplied. Where test gauges are used, it must be known that the test gauge is accurate when comparisons are made; when testing steam gauges, they should be removed from the boiler. Comparison with a second gauge attached to the boiler under pressure is not considered safe and proper practice.

**RULE 33. Boiler number.**—(a) The builder's number, if known, should be stamped on the dome with figures at least three-eighths of an inch high, preceded by the builder's name or initials, as "Baldwin No. 000." If builder's number is unknown, the assigned number should be stamped on the dome, preceded by the name or initials of the railroad, as "B. & O. No. 000." Boiler numbers once recorded on specification cards can not thereafter be changed. (See rule 54, item b.)

(b) In either case the number and initials should be stamped horizontally on the front side of dome ring near the top.

(c) If a pressed-steel dome is used, the number and initials should be stamped horizontally on the front side of the dome at the upper edge of the vertical surface.

(d) No objection has been made to the location of the number stamped on the dome where such work was done previous to the time a standard location was decided upon.

(e) Numbers which are stamped after January 10, 1912, however, should be in the proper location. Only the minimum size of the figures has been fixed.

**RULE 38. Water-glass valves.**—(a) No particular type of valve is required for water glasses or drain cocks, but such valves must be kept tight, and must be so constructed that they can be kept clean and open and so located and maintained that they can be easily opened and closed by hand, extension handles being provided if necessary.

**RULE 41. *Water and lubricator glass shield.***—(a) Since July 1, 1911, the effective date of the locomotive boiler inspection law, a great number of accidents have been reported growing out of burst water and lubricator glasses. In an effort to effect a diminution of water and lubricator glass accidents, instructions have been issued to all Government inspectors to remove from service all locomotives which are not equipped with water and lubricator glass shields in accordance with the rules.

(b) As practically all water-glass shields are patented, this bureau can not undertake to approve any particular style of shield.

(c) A spiral used as a shield is not considered a satisfactory compliance with rule 41.

(d) Shields of wire mesh have been accepted, provided the wire used in their construction is allowed to run no coarser than eight meshes per inch.

(e) Water glasses and water-glass shields should be so located, constructed, and maintained that the enginemen can at all times have a clear and easy view of the water in the glass from their usual and proper positions in the cab.

**RULE 43. *Regarding injectors.***—(a) Injectors and long injector steam pipes should be securely braced so as to avoid vibration. Records show that many serious and fatal accidents have been caused by the failure of injector steam pipes and connections.

**RULE 44. *Flue plugs.***—(a) If a plug is driven in, regardless of size of hole in it, it will have to be removed in accordance with rule 44. If plug is rolled and prossered, it is construed as a thimble and no objection will be interposed to its use at present, providing the number applied are not excessive. The use of flue thimbles, however, is not considered good practice.

**RULE 45. *Time of washing boilers.***—(a) All water changes have not been considered as washouts, and no objection has been made to the removal of the plugs in the water legs to facilitate the emptying of the boiler; however, where all plugs in water legs and back head plugs or plugs in the barrel of the boiler are removed and hose used, it is considered a washout, and it is insisted that all plugs be removed and the boiler properly washed.

(b) The removal of all plugs and a thorough washing of the boiler is also insisted on as often as water conditions require. It is not a compliance with this rule to remove all plugs once each month where water conditions require a more frequent washing. All plugs must be removed each time the boiler is washed. Experience has demonstrated that it is just as important to get all the soluble matter which causes foaming out of the boiler as it is to get out the incrusting solids.

**RULE 46. *Plugs to be removed.***—(a) The rules require that all washout plugs must be removed. We find that some roads claim that washout plugs are inspection plugs; but all inspection plugs should be considered as washout plugs, as they were put in the boiler for the purpose of washing the boiler and inspecting the boiler during the washing of the same.

**RULE 47. *Water tubes.***—(a) Arch and water bar tubes should be thoroughly cleaned with a mechanical cleaner each time the boiler is washed; it is insisted that they be thoroughly cleaned in this manner at each monthly and annual inspection. Arch or water bar tubes found defective, blistered, or bulged should be removed.

**RULE 51. *Monthly locomotive inspection and repair report.***—(See Interpretations of rule 159.)

**RULE 53. *Annual locomotive inspection and repair report.***—(See Interpretation of rule 161.)

**RULE 54. Specification card.**—(a) As some misunderstanding has arisen regarding boiler Form No. 4, specification card, due to misprint in the original edition, you are advised that the first line of this form should read: "Specification Card for Locomotive No. . . . .," the word "Boiler" in this line being in error. The road number of locomotive only is desired in this line. The builder's number of boiler should, however, appear in second item at left of first page, and also in affidavit at bottom of second page.

(b) If builder's number of boiler is unknown, a number should be assigned to the boiler, and the item "Builder's No. of Boiler" on specification card should be changed to "Assigned No. of Boiler." This assigned number should also appear in affidavit. The builder's number of the boiler must be used wherever it is known.

(c) Where a boiler is changed from one locomotive to another, such change must be promptly reported, giving the locomotive numbers and boiler numbers involved. When boilers are removed from locomotives, their disposition must be shown. Boiler numbers once recorded on specification cards can not thereafter be changed.

(d) See rule 33, paragraphs a, b, and c, and item (c), Exhibit 2, of the interpretations.

**RULE 55. Accident reports.**—(See Interpretations of rule 162.)

**RULE 104. (a)** Any competent employee can be designated as an inspector.

(b) At terminals where roundhouse foreman or general foreman is unable to approve reports on account of lack of personal knowledge, the reports may be approved by a gang foreman who has direct knowledge that the work has been done. The person, however, approving the report must be one with responsibility.

(c) The initials of the road need not appear, providing there are no duplicate engine numbers—so long as there is sufficient information to properly identify the locomotive.

(d) The instructions shown on the approved form, or "Locomotive Inspection Report," should not be varied from, nor should the form shown as Exhibit 9 be materially varied from. Additional items may be added to this form covering anything the railroad company may desire to have inspected.

(e) In road service the word "trip" as used in this rule is held to mean one way over a division or district. On branch or turn-round runs where one trip is made in a day, "trip" will be held to mean "round trip."

(f) In suburban, transfer, or short branch-line service where more than one round trip is made each day, also in yard service, "day's work" (instead of trip) will apply.

(g) For locomotives which make one or more round trips per day with one end of the run a shop point, inspections made daily at such point will be accepted as meeting the requirements of the rule, even though the day's work is not completed there.

(h) In work-train or other service where locomotives are temporarily tied up at outlying points where repairs can not be made, inspection reports may be sent to the terminal at which the locomotive is cared for.

(i) For double-crewed locomotives in yard service where crews change in the yard, one inspection and report each 24-hour period are required. This may be made when the locomotive is taken in for fuel, water, or fire cleaning. Where such locomotives do not go to the shop for this, an inspection period must be provided and the inspection, as provided by rule, made at least once each 24 hours.

(j) The number of inspections and reports required by the rule are minimum requirements and the above explanations are not intended in any way as modifications.



**RULE 107. Regarding air compressors.**—(a) The 8½-inch 120-foot Westinghouse low-pressure cross-compound air compressor having come into use since the promulgation of this rule, the chief inspector has consented that in order to maintain an approximate 80 per cent efficiency for such pumps they should under test make—

100 single strokes per minute;

Air pressure maintained, 60 pounds;

Orifice diameter, ¼ inch;

Orifice otherwise of the same dimensions as shown in figure 14 on page 88 of Rules.

The requirements of rules 106 and 107 to be otherwise complied with.

**RULE 108. Testing main reservoirs.**—(a) Test should be applied to the main reservoir at the same time the hydrostatic test is applied to the boiler. For locomotives stored for 1 or more full calendar months, this test will be due after 12 calendar months' service, provided such service is performed within 24 consecutive months. (See Interpretation (d) of rule 17.)

**RULE 116. Cabs.**—(a) It is permissible to protect cab windows on second engine in double heading with a screen.

(b) Obstructions located in front of cab windows so as to destroy a clear view of track and signals when looking ahead through these windows will not be considered a proper compliance with this rule.

(c) Clear vision windows, or the double front windows as required by the Board of Railway Commissioners for Canada in their General Order No. 131, should be applied to all locomotives operating north of a line drawn due east and west through Atlanta, Ga., Albuquerque, N. Mex., and Los Angeles, Calif. Clear-vision or double-glass windows will not be required south of this imaginary line.

(d) Steam heating radiators must not be fastened to the cab.

**RULE 117. Cab aprons.**—Records show many serious and fatal accidents due to improperly designed, applied, and maintained cab aprons. It is therefore construed that—

(a) The width of a cab apron should be such that there will be no danger of a man having his foot crushed when locomotive takes a curve.

(b) Cab apron should be of sufficient width that it will not drop between locomotive and tender, as to permit a person standing on it to fall between, when draw bar is disconnected and safety chains or safety bars taut.

(c) Cab aprons should be of sufficient length to approximately cover the space between locomotive and end sill of tender, or tender deck where tender deck is shorter than end sill.

**RULE 120. Sanders.**—(a) The words “in line with the rails” mean sand pipes fastened so that the sand will be deposited on the rails.

**RULE 122. Draw gear between locomotive and tender.**—(a) “Ample strength” for safety chains or safety bars means sufficient strength to prevent separation of locomotive and tender if draw bar fails.

(b) The combined strength of safety chains and their fastenings should be not less than 50 per cent of the strength of the draw bar and its connections.

**RULE 127. Pistons and piston rods.**—(a) See item (c), rule 133, and Interpretation (b) of rule 133.

**RULE 128. Rods, main and side.**—(a) Main rod strap-bolt holes, when elongated or enlarged, may be reduced by autogenous welding for reaming and refitting strap bolts.

(b) Special cases, such as floating bushing in back end of main rod or side rod where it is intended that bushing should turn, need not be provided with means to prevent such bushing from turning.

(c) Any means may be adopted for securing grease-cup plugs in place that will prevent them from being thrown out.

**RULE 133. *Driving, trailing, and engine truck axles.***—

(a) Worn-down axles may be turned down and used under lighter equipment. It is suggested, however, that such axles be thoroughly annealed before being further used under such circumstances.

(b) The following abbreviations may be used in stamping "kind of material" on driving, trailing, and engine truck axles, piston rods, and crank pins:

I.....	Iron.	Nkl.....	Nickel.
S.....	Steel.	Nik.....	Nikrome.
H. T. S....	Heat Treated	Cof. Proc..	Coffin Proces .
	Steel.	Cam.Spec..	Cambria Special.
Chr.....	Chrome.	Tay. I.....	Taylor Iron.
Van.....	Vanadium.		

**RULE 136. *Crank pins.***—(a) See item (c), rule 133, and Interpretation (b) of rule 133.

**RULE 139. *Frames.***—(a) Broken frames properly patched or secured by clamps or other usually recognized means which prevent the frames from working will not be objected to.

**RULE 141. *Pilots.***—(a) The minimum and maximum clearance above the rails should be measured on straight level track.

**RULE 142. *Spring rigging.***—(a) Adjusting weights by shifting weights from one pair of wheels to another is permissible.

(b) Broken springs not exceeding the requirements of the rule may be repaired by applying clips, providing the clips can be made to remain in place.

**RULE 147. *Driving and trailing wheels.***—(a) The shim which extends entirely around the wheel may be in three or four pieces, providing they do not lap. Under no circumstances should there be more than two thicknesses of shim at any one point.

**RULE 149.** (a) A cracked hub properly repaired or banded so as to hold hub from working is permissible.

**RULE 151.** (a) The weights in this table will be interpreted to be the total weight on all axles divided by the number of axles.

**RULE 155. *Tender trucks.***—(a) Friction side bearings will not be considered as in contact if you can see between them on either side.

(b) The maximum clearance on rear truck is three-eighths inch on each side and on front truck three-fourths inch on each side, when the spread of side bearings is 50 inches.

**RULE 157. *Reversing gear.***—(a) Counterbalance springs will not be required if the reversing gear can be handled properly without it.

**RULE 159. *Monthly locomotive inspection and repair report.***—(a) A monthly locomotive inspection and repair report must be filed at least once each calendar month for every locomotive in service and as nearly every 30 days as operating conditions will permit; except, no monthly report will be required for the month in which an annual report has been filed. No objection, however, will be taken by the Bureau of Locomotive Inspection if the 30-day period is not exceeded by more than 5 days when conditions fully justify. The practice of making an inspection during the first part of one month and a second inspection during the latter part of the following month, allowing a period between inspections to materially exceed the 30 days, is not considered a proper compliance with this rule nor with the intent and purpose thereof.

(b) All inspections and tests falling due at monthly periods should be made while the locomotive is out of service for this inspection.

(c) The date of the report should be the date on which the inspection and repairs are completed and locomotive made ready for service.

(d) When inspections are made at outlying points and the foreman in charge makes the inspections and repairs, in addition to certifying to the report, he may also sign as officer in charge, inasmuch as he is the one being held responsible.

(e) In subscribing to the reports any person authorized to administer an oath may do so.

(f) The report should be sworn to by the inspector or inspectors who make the inspections immediately after the inspections and repairs have been completed and the locomotive made ready for service. The officer in charge certifies to the correctness of the report.

(g) If the railroads desire for their own protection to have the master mechanic sign the report in addition to the officer in charge, there is no objection to their doing so.

(h) It is not required that the affidavit be executed on the reports filed in the railroad company's office.

(i) The reports must be filed with the United States inspector within 10 days after date of inspection.

(j) The matter of relieving the railroads from the payment of postage on reports is something over which the Bureau of Locomotive Inspection has no jurisdiction.

(k) So long as a locomotive remains on its wheels the boiler and its appurtenances should be tested and made to meet the requirements of the rules and regulations and a report filed, as required by rule 51.

(l) When locomotives are used in stationary service, items on the monthly locomotive inspection and repair reports pertaining to the boiler and its appurtenances should be correctly answered.

(m) Items pertaining to running gear, driving gear, tender, etc., may be answered by stating "Used in stationary service."

(n) When the road number of a locomotive is changed, the first inspection and repair report rendered thereafter should show in the upper right-hand corner the old and new number:

"Old No. 000  
New No. XXX"

NOTE.—See Exhibit 2, Instructions governing the preparation and handling of locomotive inspection and repair reports.

**RULE 161. *Annual locomotive inspection and repair report.***—(a) An annual locomotive inspection and repair report should be filed at least once every 12 months. No objection, however, will be taken by the Bureau of Locomotive Inspection if the 12-month period is not exceeded by more than 10 days when conditions fully justify.

(b) All inspections and tests falling due at annual periods should be made while the locomotive is out of service for this inspection.

(c) The date of the report should be the date on which the inspection and repairs are completed and locomotive made ready for service.

(d) In subscribing to the reports, any person authorized to administer an oath may do so.

(e) The report should be sworn to by the inspector or inspectors who made the inspections immediately after the inspection and repairs have been completed and the locomotive made ready for service. The officer in charge certifies to the correctness of the report.

(f) If the railroads desire for their own protection to have the master mechanic sign the report in addition to

the officer in charge, there is no objection to their doing so.

(g) It is not required that the affidavit be executed on the reports filed in the railroad company's office.

(h) The reports must be filed with United States inspector within 10 days after date of inspection.

(i) The matter of relieving the railroads from the payment of postage on reports is something over which the Bureau of Locomotive Inspection has no jurisdiction.

(j) So long as a locomotive remains on its wheels the boiler and its appurtenances should be tested and made to meet the requirements of the rules and regulations and a report filed, as required by rule 53.

(k) When locomotives are used in stationary service, items on the annual locomotive inspection and repair reports pertaining to the boiler and its appurtenances should be correctly answered.

(l) Items pertaining to running gear, driving gear, tender, etc., may be answered by stating "Used in stationary service."

(m) When the road number of a locomotive is changed, the first inspection and repair report rendered thereafter should show in the upper right-hand corner the old and new number:

"Old No. 000  
New No. XXX"

**NOTE.**—See Exhibit 2, Instructions governing the preparation and handling of locomotive inspection and repair reports.

**RULE 162. Accident reports.**—(a) Any accident resulting from failure from any cause of a locomotive or tender, including the boiler, or any of their appurtenances, resulting in serious injury or death to one or more persons, should be immediately reported by wire to the Chief Inspector at his office in Washington, D. C. Attention is

directed to section 8 of the locomotive boiler inspection act, as amended, which provides in part as follows:

\* \* \* and where the locomotive is disabled to the extent that it can not be run by its own steam, the part or parts affected by said accident shall be preserved by said carrier intact so far as possible without hindrance or interference to traffic until after said inspection. \* \* \*

(b) Regarding "seriousness of accidents before being necessary to report to Bureau of Locomotive Inspection":

(c) A serious injury is defined as an injury which prevents an employee from performing his accustomed duties for more than 3 days in the aggregate during the 10 days immediately following the accident.

(d) A "serious injury to a person other than an employee" is defined: "An injury sufficient to incapacitate the injured person from following his customary vocation or mode of life for a period of more than one day." This rule applies also to employees classed as passengers or respassers.

(e) Where injuries are of a lesser degree, they are not the subject of report.

NOTE.—See Exhibit 1.

#### MISCELLANEOUS.

(a) Regarding "Presence of representatives": In the interest of harmony representatives of the carriers are requested to be present wherever possible at all inspections and investigations.

(b) It is also suggested that the employee or his representative participate in the investigation of serious accidents where the employee is involved.

(c) The United States inspector can not make report to the carrier's representative when inspections or investigations are made in the absence of the carrier's representative.



## INSPECTION OF BRAKE AND SIGNAL EQUIPMENT.

In general, the method of inspection and tests necessary to determine if the brake equipment on the locomotive is in proper condition as required by the various rules should include the following details:

### DAILY INSPECTION AT ROUNDHOUSE.

*Compressor.*—It should first be known that the compressor has received an orifice test within the period prescribed by rule 107. If this has been done, the inspector should note when the compressor is started that the main reservoir pressure increases at about the normal rate; that the strokes are uniform; that it is not pounding; that the air strainer is clean and in good condition; that the piston rod packing is free from leakage; that the steam end, including steam cylinder valve chamber, etc., is not blowing; that the compressor and its pipe connections are free from leakage; that the drain cocks are operative; and that necessary lubricating attachments are provided and in good condition.

*Compressor governor.*—It should be noted that the governor stops the compressor when the maximum air pressure has been obtained and permits it to start with a reduction in the air pressure of not to exceed 3 pounds; that the steam vent port is open; that the leakage at the vent is not excessive; that the governor and its pipe connections are free from leakage.

*Brake valve.*—See that brake valves function properly in each position, particularly noting the following:

*Release position.*—In this position the warning port should blow and if brake-pipe angle cock is opened there should be a heavy continuous blow from the hose, and main reservoir pressure should fall at a rapid rate.

*Running position.*—It should be noted that the pressure regulators maintain the main reservoir and brake pipe at the pressures required in the service to which the locomotive is assigned.

*Holding position.*—It should be noted by the brake-cylinder gauge that the brakes do not release or cylinder pressure increase following an application.

*Lap position.*—It should be noted that the equalizing reservoir or brake-pipe pressure does not increase and that the required maximum main reservoir pressure is obtained.

*Service position.*—It should be noted that the equalizing piston lifts promptly after the movement of the brake-valve handle to service position and seats promptly upon return to lap position; also that there is no leak from the brake-pipe exhaust port and that it is provided with a proper fitting.

*Emergency position.*—It should be noted that the discharge from the brake valve is regular and that the emergency action is secured. With E. T. equipment see that the usual increase in brake-cylinder pressure over that obtained with a service application is obtained and that the safety valve on the distributing or control valve is blowing.

*Independent or straight air brake valve.*—It should be noted that the handle moves freely; that the brakes can be applied and released at the usual rate; that the handle spring will return the handle to proper position; that the reducing valve controls the cylinder pressure at the desired amount and that no leakage exists.

*Draining.*—Water or foreign matter should be drained from the main reservoir; also from other parts of the equipment which are provided with a drain, and in freezing weather drain the triple valves when necessary.

*Gauges.*—It should be noted that the air gauges have been tested within three months and are located where they may be conveniently read; that gauge glasses are tight and dials are readable; that the pipes are connected with the correct air volume, and that there is no leakage. With brakes charged to standard pressure and the automatic brake-valve handle in full release position, the gauge hands of the duplex air gauge should register within 3 pounds of the same pressure. If the gauge is found to register incorrectly, it should be properly tested and repaired before being placed in service.

*Date of tests and cleaning.*—It should be noted that distributing or control valves, reducing valves, triple valves, straight air double check valves, dirt collectors, and brake cylinders are in a safe and suitable condition for service; that they have been cleaned and lubricated as required, and that proper record thereof has been made in accordance with rule 111.

*Piston travel.*—A full service application of the brakes should be made, and the piston travel measured to see that it does not exceed the limit fixed in rule 112.

*Foundation brake gear.*—It should be noted that the foundation brake gear is in a safe and suitable condition for service and that all parts of it are at least  $2\frac{1}{2}$  inches above the rails; that all pins are properly secured in place with cotters, split keys, or nuts; that brake shoes are securely attached, are approximately in line with the treads of the wheels, and are of sufficient thickness to safely complete a trip.

*Main reservoir leakage test.*—Charge main reservoir to maximum pressure and reduce it 40 per cent. Place automatic brake-valve handle in lap position, cut out distributing valve, and see that leakage from main reservoir and related piping does not exceed 9 pounds in three minutes.

*Brake-pipe leakage test.*—Make a 10-pound brake-pipe reduction from standard pressure with automatic brake valve; then note the fall of pressure on the brake pipe or equalizing reservoir gauge. This leakage should not exceed 5 pounds per minute.

*Brake-cylinder leakage test.*—With maximum brake-pipe pressure and standard piston travel make a full service application and close communications to brake cylinders. Brake shoes should be held against the wheels with force for at least five minutes.

*Signal system.*—Determine by inspection that the signal system is free from leakage and see that the air pressure is standard, and that when a reduction is made in the signal line the signal whistle responds promptly.

*Quarterly orifice test of compressor.*—First see that leakage from main reservoir and related piping is not excessive. Place automatic brake valve in lap position, cut out distributing or control valve, apply test fitting with proper orifice disk for the compressor to be tested, charge main reservoir to 60 pounds, regulate the speed of the compressor with the steam throttle until pressure remains constant at 60 pounds, then count the single strokes of the compressor per minute. (If test fitting is applied at rear tender, distributing or control valve need not be cut out and brake valve should be in full release position.)

## EXHIBIT 1.

### TELEGRAPHIC REPORTS TO THE BUREAU OF LOCOMOTIVE INSPECTION.

All accidents resulting from failure, from any cause or improper condition, of a locomotive or tender, including the boiler or any of their appurtenances, resulting in serious injury or death to one or more persons should be reported by telegraph to the Chief Inspector of Locomotives at his office in Washington, D. C., in accordance with rules 55 and 162 of the Rules and Instructions for Inspection and Testing of Locomotives and Tenders and their Appurtenances, approved by orders of the Interstate Commerce Commission of June 2, 1911, September 12, 1912, June 9, 1914, October 11, 1915, June 30, 1916, November 13, 1916, December 26, 1916, December 17, 1917 and April 7, 1919.

"Death" is defined: "Casualty causing the death of a person within 24 hours after the accident."

A "serious injury" is defined: "An injury which prevents an employee from performing his accustomed duties for more than 3 days in the aggregate during the 10 days immediately following the accident."

A "serious injury to a person other than an employee" is defined: "An injury sufficient to incapacitate the injured person from following his customary vocation or mode of life for a period of more than one day." This rule applies also to employees classed as passengers or trespassers.

Telegrams should be addressed:

A. G. PACK,  
*Interstate Commerce,*  
*Washington.*

The telegram should state:

1. Date of accident.
2. Place at which accident occurred.
3. Name of railroad.
4. Number of locomotive.
5. Nature of accident.
6. Number of persons killed or seriously injured.
7. Place where locomotive may be inspected or investigation made.

It will not be necessary to report by wire or by letter accidents caused by the failure of any part or appurtenance of the locomotive or

tender, including the boiler, to the Bureau of Safety of the Interstate Commerce Commission, except derailments and collisions as provided in the "Accident reports act" approved May 6, 1910.

The making of telegraphic or mail reports above described, either to the Bureau of Safety or to the Bureau of Locomotive Inspection, will not relieve the carriers from reporting such accidents as required by law in their monthly reports to the Bureau of Statistics of the Interstate Commerce Commission.

## EXHIBIT 2.

### INSTRUCTIONS GOVERNING THE PREPARATION AND HANDLING OF LOCOMOTIVE INSPECTION AND REPAIR REPORTS.

#### MONTHLY REPORT, FORM No. 1.

(See Exhibit 3.)

The month and year for which the report is filed should be inserted in the upper left-hand corner of report, and the number of the locomotive and the initials should be given in the upper right-hand corner. By the initials of the locomotive is meant the initial of the road owning (not operating) the locomotive, and not the class designation. The name of the company operating the locomotive should appear on the line at the top of the report; the initials of the company are not satisfactory. The locomotive number should be filled in on line 2 of the body of report and should correspond with that given in upper right-hand corner of report. The date and place that the inspection and repairs are made should be filled in on line 3 of body of report. The date should be the date on which repairs were completed.

*Item 1* should show the date on which steam gauges were tested and left in good condition. Steam gauges should be tested immediately before the safety valves are set or any changes made in the setting.

*Item 2* should show the pressure at which each safety valve is set to pop. If the locomotive is equipped with only two safety valves the space on report for the third safety valve should be filled in with the word "None." The date of the setting should be given.

*Item 3* should be answered "Yes" or "No."

*Item 4* should be answered "Yes" or "No."

Note: This question refers to all steam leaks other than those existing in the boiler proper.

*Item 5* requires two answers; first, showing condition of brake equipment; second, showing condition of signal equipment. If signal equipment is not used the answer should be "Not used."

*Item 6* requires two answers; first, showing condition of draft gear; second, showing condition of draw gear. The month in which the drawbar and pins are removed and inspected should show, in addition to the two answers called for, "Removed and inspected," which may be placed on the margin of the report if necessary.

*Item 7* should show condition of driving gear.

*Item 8* should show condition of running gear.

*Item 9* should show condition of tender. When locomotives have saddle tanks and no tender this item should be answered "Not used."

Note: This answer should cover all parts of tender not covered in items 5, 6, and 8.

*Item 10* requires two answers, and should be answered "Yes" or "No."

*Item 11* should be answered "Yes" or "No."

Note: This item refers to all steam leaks existing in the boiler proper.

*Item 12* requires two answers; first, showing condition of staybolts; second, showing condition of crown stays.

*Item 13* requires two answers; first, showing number of stay bolts renewed; second, showing number of crown stays renewed.

*Item 14* requires two answers; first, showing condition of flues; second, showing condition of firebox sheets.

*Item 15* requires two answers; first, showing condition of arch tubes; second, showing condition of water bar tubes. If either are not used the answer should be "Not used."

*Item 16* should be answered "Yes" or "No." If not used answer should be "Not used."

*Item 17:* Date of previous hydrostatic test must be given.

*Item 18:* Date of removal of caps from flexible stay bolts must be given. If locomotive is not equipped with flexible stay bolts having caps the answer should be "Not used."

#### ANNUAL REPORT, FORM 3.

(See Exhibit 5.)

The month and year for which report is filed should be inserted in the upper left-hand corner of report and the number of the locomotive and initials should be given in the upper right-hand corner. By the initials of the locomotive is meant the initials of the road owning (not operating) the locomotive, and not the class designation. The name of the company operating the locomotives should appear on the line at the top of the report; the initials of the company are not satisfactory. The locomotive number should be filled in on line 2 of the body of the report and should correspond with that given in the upper right-hand corner of report. The date and place that the inspection and repairs are made should be filled in on line 3 of body of report. The date should be the date on which repairs were completed.

*Item 1:* Date of previous hydrostatic test must be given.

*Item 2:* Date of previous removal of caps from flexible stay bolts must be given. If locomotive is not equipped with flexible stay bolts having caps, the answer should be "Not used."



*Item 3:* Date of previous removal of all flues must be given.

*Item 4:* Date of previous removal of all lagging from boiler must be given.

*Item 5* should show the pressure applied when hydrostatic test was given.

*Item 6* should be answered "Yes" or "No." If flexible stay bolts are not used, the question should be answered "Not used."

*Item 7* requires two answers; first, should be answered "Yes" or "No"; second, number of flues removed should be given.

Note: If locomotive is equipped with superheater flues and same are not removed, but all of the small flues are removed, answer to the first question should then be "Yes, except superheater flues," which notation may be made on margin of report. When boiler is equipped with preheater flues, the date of removal of flues from boiler and preheater should be given separately.

*Item 8* should give the condition of the interior of the barrel of boiler, if all flues are removed, or if a sufficient number of flues are removed to allow a thorough examination of the interior of the boiler. If such a number of flues are not removed, but the interior of the barrel above the flues is examined, this item should give the condition of the interior of the barrel above the flues. For example, "Good above flues."

*Item 9* should be answered "Yes" or "No."

*Item 10* should give the condition of the exterior of the boiler, if sufficient lagging is removed to permit a thorough inspection. If not, the answer should be "Not inspected."

Note: This inspection should be made while boiler is under pressure.

*Item 11* should be answered "Yes" or "No."

*Item 12* requires two answers, each of which should be answered "Yes" or "No."

*Item 13* requires two answers; first, showing condition of crown stays; second, showing condition of stay bolts.

*Item 14* requires two answers; first, showing condition of sling stays; second, showing condition of crown bars, as far as can be inspected.

Note: If boiler is not equipped with either sling stays or crown bars, the answer to either question should be "None used."

*Item 15* requires two answers; first, showing condition of fire-box sheets; second, showing condition of flues.

*Item 16* requires two answers; first, showing condition of arch tubes; second, showing condition of water-bar tubes.

Note: When arch tubes or water-bar tubes are not used, the answer in either case should be "Not used."

*Item 17* should give the condition of throat braces, if inspected. If they can not be inspected, the answer should be "Not inspected."

*Item 18* should give the condition of back-head braces, whenever it is possible for these braces to be inspected. If not inspected, the answer should be "Not inspected."

*Item 19* should give the condition of front-flue sheet braces whenever it is possible for these braces to be inspected. If not inspected, the answer should be "Not inspected."

*Item 20:* If boiler is equipped with fusible plugs, should be answered "Yes" or "No."

Note: If boiler is not equipped with fusible plugs, the answer should be "Not used."

*Item 21* should be answered "Yes" or "No."

Note: This question refers to all steam leaks existing in the boiler proper.

*Item 22* should be answered "Yes" or "No."

*Item 23* should show the pressure at which each safety valve is set to pop. If locomotive is only equipped with two safety valves, space on report for third safety valve should be filled in with the word "None."

*Item 24* should be answered "Yes" or "No."

*Item 25* should be answered "Yes" or "No."

Note: This item refers to all steam leaks other than those existing in boiler proper.

*Item 26* should show pressure applied to main reservoirs when hydrostatic tests were applied. When new reservoirs are applied for which a sworn report of hydrostatic test has been furnished by the builders, the test pressure should be followed by the words "Builder's test."

*Item 27* requires two answers—first, showing condition of brake equipment; second, showing condition of signal equipment. If signal equipment is not used, the answer should be "Not used."

*Item 28* should be answered "Yes" or "No."

*Item 29* requires two answers—first, showing condition of draft gear; second, showing condition of draw gear.

*Item 30* should show the condition of driving gear.

*Item 31* should show the condition of running gear.

*Item 32* should show the condition of tender.

Note: This item to cover all parts of tender not covered in items 27, 28, 29, and 31.

## GENERAL INSTRUCTIONS APPLICABLE TO BOTH MONTHLY AND ANNUAL REPORTS.

### FORMS 1 AND 3.

(a) The report may be signed and certified to by one or more inspectors. If one inspector has personal knowledge that all the work shown on the report has been performed, he may so certify; otherwise, each inspector

should sign, in which case each should indicate before his signature the number of the items to which he is certifying. For example:

Form No. 3.—Items 1 to 11, John Smith.

Items 12 to 21, William Johnson.

Form No. 1.—Items 1 to 5, John Smith.

Items 6 to 9, Frank Jones.

(b) Exhibits 3 and 5 show how reports should be made out when signed by one or more inspectors.

(c) The officer in charge must know that work has been properly done. If the master mechanic or general foreman has such knowledge, reports signed by him will be accepted, otherwise they should be signed by the foreman who is in direct charge of the work and has personal knowledge that it has been properly performed.

(d) Monthly and annual reports should be sworn to before a notary public by the inspector making the inspection. The officer in charge certifies to the correctness of the reports.

(e) It is desired that the reports be filled in with typewriter, ink, or rubber stamp. While the use of indelible pencil is allowed, typewriter or ink is preferred.

(f) Reports which are sent in to take the place of ones previously filed but which were incorrect should bear the notation "Corrected report" at the top of the report, and should be forwarded to the Federal inspector, unless otherwise advised.

(g) Such words as "Safe" and "O. K." should not appear in any answer to the items on either report. The answers should show the exact conditions found.

(h) Where the questions require the condition to be shown, the answers may be either "Good," "Fair," or "Bad," and the following definitions will apply to these terms:

*Good:* That part or parts have no defects which could be discovered by a reasonable inspection.

*Fair:* That the part or parts have defects, but are in a safe and suitable condition, and not in violation of the rules.

*Bad:* That the part or parts are not in a safe or suitable condition, or are in violation of the rules.

(i) It is not required to have the affidavit executed on the report filed in the railroad company's office.

(j) No monthly report, Form 1, will be required for the month in which an annual report, Form 3, has been made.

**OUT OF SERVICE REPORT.**

(See Exhibit 4.)

(a) Out of service reports may be filed for locomotives which are out of service for an entire calendar month, or are out of service when due for inspection and remain out for the balance of the month.

(b) When out of service report has been filed, an inspection must be made and report filed before the locomotive is again returned to service.

(c) Out of service report should not be filed until the end of the month for which it is to cover. They need not be sworn to, but should be signed by the officer in charge.

**FINAL REPORT.**

(See Exhibit 6.)

(a) When a locomotive is permanently retired from service on account of having been condemned, scrapped, or sold, a final report, on Form 3, giving the locomotive number and the boiler number, should be filed with the Federal inspector. This report is to be certified to by the mechanical engineer or chief mechanical officer and when filed will close the record for the locomotive so reported and further reports need not be filed.

(b) If the boiler only is scrapped or otherwise disposed of and the locomotive continued in service with a new boiler, the report should show the number of the new boiler with the disposition and number of the old boiler.

(c) Where a boiler is changed from one locomotive to another, such change must be noted on the report, giving the locomotive numbers and boiler numbers involved.

# **EXHIBIT S.** **MONTHLY LOCOMOTIVE INSPECTION AND REPAIR REPORT.**

October, 1916.

Locomotive { Number 000  
Initial BAO  
COMPANY.

Baltimore & Ohio Railroad

In accordance with the act of Congress approved February 17, 1911, as amended March 4, 1915, and the rules and instructions issued in pursuance thereof and approved by the Interstate Commerce Commission, all parts of locomotive No. 000 including the boiler and appurtenances, were inspected on October 7, 1916, at Baltimore, Md. and all defects disclosed by said inspection have been repaired, except as noted on the back of this report.

1. Steam gauges tested and left in good condition on Sept. 7 1916
2. Safety valves set to pop at 200 pounds, 203 pounds, None pounds on Sept. 7, 1916.
3. Were both injectors tested and left in good condition? Yes
4. Were steam leaks repaired? Yes
5. Condition of brake and signal equipment, Good-Not used
6. Condition of draft gear and draw gear Good-Good-Rem. & insp.
7. Condition of driving gear, Good
8. Condition of running gear, Good
9. Condition of tender, Good

I certify that the above report is correct.

Items 1 to 5 John Smith Inspector  
" 6 to 9 Frank Jones  
STATE OF Maryland  
COUNTY OF Baltimore

SUBSCRIBED AND SWORN TO before me this 8th day of October, 1916, by { John Smith  
Frank Jones  
Inspectors of the Baltimore & Ohio Railroad Company. William Jones

The above work has been performed and the report is approved.

John Brown, Notary Public.  
William Johnson, Officer in Charge.

10. Was boiler washed and gauge cocks and water glass rock spindles removed and cocks cleaned? Yes-Yes
11. Were steam leaks repaired? Yes
12. Condition of staybolts and crown stays, 4 broken-Good
13. Number of staybolts and crown stays renewed, 4-None
14. Condition of flues and fire-box sheets, Good-Fair
15. Condition of arch and water bar tubes, if used, Good-Not used
16. Were fusible plugs removed and cleaned? Not used
17. Date of previous hydrostatic test, July 1, 1916
18. Date of removal of caps from flexible staybolts, Not used, 1916

I certify that the above report is correct.

William Jones Inspector.

**EXHIBIT 4.**  
**MONTHLY LOCOMOTIVE INSPECTION AND REPAIR REPORT.**  
**OUT OF SERVICE REPORT**

Form No. 1.

Locomotive (Number Initial)  
 \_\_\_\_\_, 191

COMPANY.

In accordance with the act of Congress approved February 17, 1911, as amended March 4, 1915, and the rules and instructions issued in pursuance thereof and approved by the Interstate Commerce Commission, all parts of locomotive No. \_\_\_\_\_, including the boiler and appurtenances, were inspected on \_\_\_\_\_, 191, at \_\_\_\_\_, and all defects disclosed by said inspection have been repaired, except as noted on the back of this report.

1. Steam gauges tested and left in good condition on \_\_\_\_\_, 191
  2. Safety valves set to pop at \_\_\_\_\_ pounds, \_\_\_\_\_ pounds on \_\_\_\_\_, 191
  3. Were both injectors tested and left in good condition? \_\_\_\_\_
  4. Were steam leaks repaired? \_\_\_\_\_
  5. Condition of brake and signal equipment, \_\_\_\_\_
  6. Condition of draft gear and draw gear, \_\_\_\_\_
  7. Condition of driving gear, \_\_\_\_\_
  8. Condition of running gear, \_\_\_\_\_
  9. Condition of tender, \_\_\_\_\_
- I certify that the above report is correct.

Inspector.

STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

SUBSCRIBED AND SWORN TO before me this \_\_\_\_\_ day of \_\_\_\_\_, 191, by {

inspectors of the \_\_\_\_\_ Company.

The above work has been performed and the report is approved.

Notary Public.

Officer in Charge.

## EXHIBIT 5.

Form No. 2 ANNUAL LOCOMOTIVE INSPECTION AND REPAIR REPORT

October 1916 Baltimore & Ohio Railroad Company

Locomotive No. 000 Initial 000

In accordance with the act of Congress approved February 17, 1911, as amended March 4, 1915, and the rules and instructions issued in pursuance thereof and approved by the Interstate Commerce Commission, all parts of locomotive No. 000, including the boiler and its appurtenances, were inspected on October 7, 1916, at Mt. Clear, Balto., Md., and all defects disclosed by said inspection have been repaired, except as noted on the back of this report.

1. Date of previous hydrostatic test, Dec. 15, 1915
2. Date of previous removal of caps from flexible staybolts, Dec. 15, 1915
3. Date of previous removal of flues, Dec. 15, 1915
4. Date of previous removal of all lagging, Oct. 7, 1914
5. Hydrostatic test pressure of 250 pounds was applied.
6. Were caps removed from all flexible stay bolts? No
7. Were all flues removed? Yes Number removed 275
8. Condition of interior of barrel, Good
9. Was all lagging removed? No
10. Condition of exterior of barrel, Not inspected
11. Was boiler entered and inspected? Yes
12. Was boiler washed? Water plus cocks and gauge cocks cleaned? Yes
13. Condition of crown stays and staybolts, Good-Good
14. Condition of lining stays and crown bars, Not used
15. Condition of firebox sheets and flues, Good-Good
16. Condition of arch tubes, Good Water bar tubes, Not used
17. Condition of throat braces, Good
18. Condition of back head braces, Good
19. Condition of front flue sheet braces, Good
20. Were fusible plugs removed and cleaned? Not used
21. Were steam leaks repaired? Yes
22. Were steam gauges tested and left in good condition? Yes
23. Safety valves set to pop at 180 pounds, 183 pounds, 185 pounds.
24. Were both injectors tested and left in good condition? Yes
25. Were steam leaks repaired? Yes
26. Hydrostatic test of 225 pounds applied to main reservoir.
27. Condition of brake and signal equipment, Good-Not used
28. Were draw bar and draw bar pins removed and inspected? Yes
29. Condition of draft gear and draw gear, Good-Good
30. Condition of driving gear, Good
31. Condition of running gear, Good
32. Condition of tender, Good

I certify that the above report is correct.

STATE OF Insert

County of Insert

Subscribed and sworn to before me this 8th day of October, 1916, by

Inspector

Inspector of the

The above work has been performed and the report is approved.

Frank Jones, Inspector

John Smith, Inspector of the

William Johnson, Inspector of the

Frank Jones, Notary Public.

W. W. Williams, Officer in Charge.

## EXHIBIT 6.

Form No. 1

ANNUAL LOCOMOTIVE INSPECTION AND REPAIR REPORT  
FINAL REPORTLocomotive No. \_\_\_\_\_  
Number \_\_\_\_\_  
Initial \_\_\_\_\_

Company \_\_\_\_\_

In accordance with the act of Congress approved February 17, 1911, as amended March 4, 1916, and the rules and instructions issued in pursuance thereof and approved by the Interstate Commerce Commission, all parts of locomotive No. \_\_\_\_\_, and all defects disclosed by appearances, were inspected on \_\_\_\_\_, 1911, at \_\_\_\_\_, and inspection have been repaired, except as noted on the back of this report.

1. Date of previous hydrostatic test, \_\_\_\_\_, 1911
2. Date of previous removal of caps from flexible staybolts \_\_\_\_\_, 1911
3. Date of previous removal of flues, \_\_\_\_\_, 1911
4. Date of previous removal of all lagging, \_\_\_\_\_, 1911
5. Hydrostatic test pressure of \_\_\_\_\_ pounds was applied.
6. Were caps removed from all flexible stay bolts? \_\_\_\_\_
7. Were all flues removed? \_\_\_\_\_ Number removed \_\_\_\_\_
8. Condition of interior of barrel, \_\_\_\_\_
9. Was all lagging removed? \_\_\_\_\_
10. Condition of exterior of barrel, \_\_\_\_\_
11. Was boiler entered and inspected? \_\_\_\_\_
12. Was boiler washed? \_\_\_\_\_ Water glass cocks and gauge cocks cleaned? \_\_\_\_\_
13. Condition of cross stays and staybolts \_\_\_\_\_
14. Condition of leading stays and lower bars \_\_\_\_\_
15. Condition of firebox \_\_\_\_\_
16. Condition of ashpan \_\_\_\_\_
17. Condition of smokestack \_\_\_\_\_
18. Condition of smokestack \_\_\_\_\_
19. Condition of test flue sheet braces \_\_\_\_\_
20. Were plug holes removed and checked? \_\_\_\_\_
21. Were main leads repaired? \_\_\_\_\_
22. Were steam gauges tested and left in \_\_\_\_\_ condition? \_\_\_\_\_
23. Safety valves set to pop at \_\_\_\_\_ pounds.
24. Were both injectors tested and left in \_\_\_\_\_ condition? \_\_\_\_\_
25. Were steam leaks repaired? \_\_\_\_\_
26. Hydrostatic test of \_\_\_\_\_ pounds applied to main reservoir.
27. Condition of brakes and signal equipment. \_\_\_\_\_
28. Were drawbar and drawbar pins removed and inspected? \_\_\_\_\_
29. Condition of draft gear and draw gear, \_\_\_\_\_
30. Condition of driving gear, \_\_\_\_\_
31. Condition of running gear, \_\_\_\_\_
32. Condition of tender, \_\_\_\_\_

I certify that the above report is correct.

STATE OF \_\_\_\_\_, County of \_\_\_\_\_, day of \_\_\_\_\_, 1911, by \_\_\_\_\_, Inspector

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, 1911, by \_\_\_\_\_, Notary Public.

The above work has been performed and the report is approved \_\_\_\_\_, Officer in Charge.



## EXHIBIT 7.

Boiler Form No. 4.

## Specification Card for Locomotive No. \_\_\_\_\_

Owned by \_\_\_\_\_ Railroad Company.  
 Operated by \_\_\_\_\_ Railroad Company.

Builder \_\_\_\_\_  
 Builder's No. of Boiler \_\_\_\_\_  
 When built \_\_\_\_\_  
 Where built \_\_\_\_\_  
 Type of boiler \_\_\_\_\_  
 Material of boiler shell sheets \_\_\_\_\_  
 Material of rivets \_\_\_\_\_  
 Dome, where located \_\_\_\_\_  
 Grate area in sq. ft. \_\_\_\_\_  
 Height of lowest reading of gauge glass above crown sheet \_\_\_\_\_  
 Height of lowest gauge cock above crown sheet \_\_\_\_\_  
 Water-bar tubes, O. diam. \_\_\_\_\_ thickness \_\_\_\_\_  
 Arch tubes, O. diam. \_\_\_\_\_ thickness \_\_\_\_\_  
 Fire tubes, number \_\_\_\_\_  
 " " O. diam. \_\_\_\_\_ length \_\_\_\_\_  
 Safety valves:  
 No. Size Make Weir.  
 \_\_\_\_\_  
 \_\_\_\_\_  
 Firebox stay bolts, O. diam. \_\_\_\_\_ spaced \_\_\_\_\_ x \_\_\_\_\_  
 Combustion chamber stay bolts, O. diam. \_\_\_\_\_ spaced \_\_\_\_\_ x \_\_\_\_\_  
 " " " " spaced \_\_\_\_\_ x \_\_\_\_\_  
 Crown stays, O. diam., top \_\_\_\_\_ bottom \_\_\_\_\_  
 " " spaced \_\_\_\_\_ x \_\_\_\_\_  
 Crown-bar rivets, O. diam., top \_\_\_\_\_ bottom \_\_\_\_\_  
 " " " " spaced \_\_\_\_\_ x \_\_\_\_\_  
 Water space at firebox ring, sides \_\_\_\_\_  
 back \_\_\_\_\_ front \_\_\_\_\_  
 Width of water space at sides of firebox measured at center line of boiler, front \_\_\_\_\_ back \_\_\_\_\_

Shell sheets:  
 Front tube \_\_\_\_\_ thick.  
 1st course \_\_\_\_\_ " \_\_\_\_\_ I. diam.  
 2d " \_\_\_\_\_ " \_\_\_\_\_ "  
 3d " \_\_\_\_\_ " \_\_\_\_\_ "  
 Note: When courses are not cylindrical give inside diameter at each end.  
 Firebox:  
 Thickness of sheets—  
 Tube \_\_\_\_\_ Crown \_\_\_\_\_ Side \_\_\_\_\_  
 Door \_\_\_\_\_ Combustion chamber \_\_\_\_\_  
 Inside throat (if tube sheet is in two pieces) \_\_\_\_\_  
 External firebox:  
 Thickness of sheets—throat \_\_\_\_\_ back head \_\_\_\_\_  
 Roof \_\_\_\_\_ sides \_\_\_\_\_  
 Dome inside diam. \_\_\_\_\_  
 Thickness of sheet \_\_\_\_\_ base \_\_\_\_\_ liner \_\_\_\_\_  
 Were you furnished with authentic records of the tests of materials used in boiler? \_\_\_\_\_  
 Records on file in the office of the \_\_\_\_\_  
 of the \_\_\_\_\_ Company  
 show that the lowest tensile strength of the sheets in the shell of this boiler is:  
 1st course \_\_\_\_\_ pounds per sq. in.  
 2d " \_\_\_\_\_ " " "  
 3d " \_\_\_\_\_ " " "  
 Is boiler shell circular at all points? \_\_\_\_\_  
 If shell is flattened, state location and amount \_\_\_\_\_  
 Are all parts thoroughly stayed? \_\_\_\_\_  
 Are dome and other openings sufficiently reinforced? \_\_\_\_\_  
 Is boiler equipped with fusible plugs? \_\_\_\_\_

Make working sketch here or attach drawing of longitudinal and circumferential seams used in shell of boiler, indicating on which courses used and give calculated efficiency of weakest longitudinal seam.

[over.]

The maximum stresses at the allowed working pressure were found by calculation to be as follows:

Stay bolts at root of thread .....	lbs. per sq. in.	Round and rectangular braces .....	lbs. per sq. in.
Stay bolts at reduced section .....	" " "	Gusset braces .....	" " "
Crown stays or crown-bar rivets at root of thread or		Shearing stress on rivets .....	" " "
smallest section, top .....	lbs. per sq. in.	Tension on net section of plate in longitudinal seam of	
Crown stays or crown-bar rivets at root of thread or		lowest efficiency, pounds per sq. in. ....	
smallest section, bottom .....	lbs. per sq. in.		

Dimensions and data taken from locomotive were furnished by .....  
 Data upon which above calculations were made were obtained from drawing No. ....  
 dated ..... furnished by ..... Company.

.....  
*Mechanical Engineer.*

STATE OF ..... } ss:  
 COUNTY OF .....

..... being duly sworn says that he is the officer who  
 signed the foregoing specification, that he has satisfied himself of the correctness of the drawings and data  
 used, has verified all of the calculations, and has examined the record of present condition of boiler dated  
 ..... and sworn to by inspector .....  
 and believes that the design, construction, and condition of boiler No. .... renders it safe for a working  
 pressure of ..... pounds per square inch. "

.....  
 (Name of witness)

Subscribed and sworn to before me  
 this ..... day of ....., 191

.....  
*Notary Public.*

Approved: .....

Form No. 19.

EXHIBIT 8.

ALTERATION REPORT FOR LOCOMOTIVE BOILERS.

The following alterations were made on the boiler of locomotive No. .... owned by .....  
Company and operated by ..... Company, on ..... 192 , at.....

..... The builder's or assigned number stamped on the dome of this boiler is.....

NOTE.—Describe below what alterations were made. When blue prints or drawings accompany report, paste same  
below or on back of report.

[Enter details here.]

STATE OF ..... } ss:  
COUNTY OF .....

..... being duly sworn says that he inspected the above-mentioned alterations and certifies  
that the above report is correct.

Subscribed and sworn to before me this ..... day of ..... 192 .

.....  
(Name of affiant.)

.....  
Notary Public

The above alterations have caused the following changes in calculated maximum stresses for this boiler:

NOTE.—If stresses are not affected by the alterations, insert the words, "Stresses not changed."

.....  
Mechanical Engineer.

## INSTRUCTIONS FOR PREPARING FORM 19.

Follow paragraph b, rule 54.

Describe accurately what alterations were made.

The location and extent of cracks, pitting, corrosion, and grooving must be shown and dimensioned unless the defective plate is removed.

Drawing must show whether the plate underneath patch was removed.

Report must state whether iron or steel rivets were used.

The size of rivet holes must be given as well as the size of the rivets.

If authentic records of the tests of material used in making repairs can be obtained, the lowest tensile strength as shown by test must be given; otherwise 50,000 pounds for steel and 45,000 pounds for wrought iron will be allowed as provided by rule 4.

In case of patches applied prior to July 9, 1914, if there is no authentic record of the date when or the shop where the alteration was made, insert the word "Unknown" in the proper blank spaces.

It is not necessary to report patches on surfaces supported by stay bolts.

## ЕХНІВІТ 9.

Form No. 2.

Locomotive { Number.....  
Initials .....

**Railroad.**.....

## LOCOMOTIVE INSPECTION REPORT.

**Instructions.**—Each locomotive and tender must be inspected after each trip or day's work and report made on this form, whether needing repairs or not. Proper explanation must be made hereon for failure to repair any defects reported, and the form approved by foreman, before the locomotive is returned to service.

Inspected at ..... time ..... m. Date ..... 191..

**Repairs needed:**

**Condition of injectors.....**

Condition of gauge cocks ..... Brakes.

Condition of piston rod and valve stem packing:

Safety valve lifts at ..... pounds. Seats at ..... pounds.

Main reservoir pressure, ..... pounds. Brake pipe pressure, ..... pounds.

**(Signature)**

**(Occupation)**

**The above work has been performed, except as noted, and the report is approved.**

..... Foreman.

**NOTE.**—Additional items may be added to this form if desired.









